4.2.5.10 Waste Management

This section summarizes the impacts on waste management at ORR under No Action and for each of the long-term storage alternatives to include the phaseout of HEU storage. There is no spent nuclear fuel or HLW associated with Pu or HEU storage. Table 4.2.5.10–1 lists the projected waste generation rates and treatment, storage, and disposal capacities under No Action for the ORR for 2005. Projections for No Action were derived from the most recent available environmental data, with the appropriate adjustments made for those changing operational requirements where the volume of wastes generated were identifiable. The projection does not include wastes from future, yet uncharacterized, environmental restoration activities. The projections for No Action could change significantly depending on the decisions resulting from the PEIS on waste management being prepared by the Department. Table 4.2.5.10–2 provides the estimated incremental operational waste volumes projected to be generated at ORR as a result of the various storage alternatives prior to treatment. Some of the waste values described in this section are different than the waste values in the table. For those values that differ (for example LLW), the table gives waste generated pre-treatment values and the text discusses post-treatment values (indicated as after treatment and volume reduction). For example, the collocated new Pu storage facility and new HEU storage facility would generate 2.1 m^3 (555 gal) of liquid LLW. Since ORR already stores HEU, the waste volumes associated with the phaseout of HEU storage (0.4 m^3 [106 gal]) must be subtracted out to avoid double counting waste volumes associated with HEU storage. This results in a net incremental increase from the alternative of 1.7 m^3 (449 gal). The subtraction of phaseout volumes to avoid the double counting of waste volumes is only applicable to the collocation alternative (new Pu and HEU storage facility). The waste volumes generated from the various storage alternatives and the resultant waste effluent used for the waste impact analysis can be found in Section E.3.1. For the collocation alternative (new Pu and HEU facility), the waste effluent volumes in the impact analysis refer only to wastes from the applicable storage facility, not the net incremental increase/decrease for ORR as a whole. Facilities that would support the storage of Pu and/or HEU would treat and package all waste generated into forms that would enable staging and/or disposal in accordance with RCRA and other applicable statutes. Depending in part on decisions in the ROD for the Waste Management PEIS, wastes could be treated and disposed of onsite or at regionalized or centralized DOE sites. For the purposes of analyses only, this PEIS assumes that TRU and mixed TRU waste would be treated onsite to the current planning-basis WIPP WAC, and shipped to WIPP for disposal. This PEIS also assumes that LLW, mixed LLW, hazardous, and nonhazardous waste would be treated and disposed of in accordance with current site practice.

No Action Alternative

Under this alternative spent nuclear fuel and TRU, low-level, mixed, hazardous, and nonhazardous wastes would continue to be generated at ORR from the missions outlined in Section 3.6. Under No Action, ORR would continue to store HEU, and treat, store, and dispose of its legacy and newly generated wastes in current and planned facilities.

A small quantity of spent nuclear fuel could be generated by the ORNL High-Flux Isotope Reactor in the production of isotopes for commercial applications and in conducting research. The reactor pool is almost full, but reracking positions for the fuel is under way. This will provide storage space for the spent fuel generated by the reactor until 2000 (OR LMES 1996a:3-3,3-4). Installing modular dry storage units at the site for further storage is being planned (DOE 1995w:3.2-12). Other fuel and irradiated nuclear material is stored in various locations at ORR. In accordance with the ROD (60 FR 28680) from the *Department of Energy Programmatic Spent Nuclear Fuel Management and Idaho National Engineering Laboratory Environmental Restoration and Waste Management Programs Final Environmental Impact Statement* (DOE-EIS-0203-F), ORR would ship 46 t (51 tons) of spent nuclear fuel to INEL and SRS.

Small quantities of TRU waste would be generated from isotope production and research activities at ORNL. Most of this waste would be generated in remedial action projects. TRU waste previously buried and stored

would be repackaged into TRUPACT-II containers for eventual shipment to WIPP. If shipments to WIPP were delayed, plans for additional TRU storage facilities would be incorporated in the design of these facilities.

Liquid LLW would be solidified, neutralized, and allowed to evaporate. Some liquid waste would also be incinerated. Solid LLW would be compacted and stored onsite at K–25 and ORNL. Contaminated scrap metal would be processed for beneficial reuse where possible, including the DOE Shielding Block Program, or be size-reduced for disposal. Hazardous waste would be treated in both onsite and offsite RCRA-permitted facilities. Disposal of hazardous wastes would be provided by offsite facilities licensed to dispose of waste regulated under RCRA.

Mixed waste would be treated and disposed of according to the ORR Site Treatment Plan, which was developed pursuant to the *Federal Facility Compliance Act*. Liquid mixed waste would also be incinerated at the TSCA Incinerator. The resulting waste would then be stored in a RCRA-permitted facility in DOT-approved containers until it is shipped to an offsite DOE disposal facility. Some of this waste would be placed in interim storage until new technologies for treatment and disposal are identified and evaluated.

A new industrial pretreatment facility for liquid discharges from Y–12 to the City of Oak Ridge sanitary system would be constructed under the terms of their Industrial Pretreatment Permit. Nonhazardous sanitary and nonradioactive process waste liquids would be treated in conventional sewage treatment plants. The resultant solids would be disposed of with solid nonhazardous waste in a permitted landfill sized to handle projected future waste volumes.

Upgrade Alternative

Preferred Alternative: Modify Existing Y–12 Plant for Continued Highly Enriched Uranium Storage

Construction and operation of an upgraded HEU storage facility would have a minimal impact on existing ORR waste management activities. Waste generated during construction would consist of solid LLW and nonhazardous waste. The nonhazardous waste would be disposed of as part of the construction project by the contractor. The low-level contaminated concrete would be placed in appropriate containers and shipped to a DOE LLW disposal facility. The low-level contaminated steel would go to the contaminated Scrap Metal Yard, where it would be shipped to an offsite contractor for processing for beneficial reuse where possible, including the DOE Shielding Block Program.

Operation of the upgraded facility presents very little increase in low-level, mixed, hazardous, and nonhazardous waste volumes as compared to the No Action volumes for any waste category. The contribution of this operation to the ORR waste management activities is illustrated in Table 4.2.5.10–2 and could easily be handled by existing waste management facilities.

Collocation Alternative

Construct New Plutonium Storage Facility; Maintain Existing Highly Enriched Uranium Storage Facilities at Y–12 Plant

Construction and operation of a consolidated Pu storage facility in conjunction with No Action for HEU storage would have an impact on existing ORR waste management activities, increasing the generation of TRU, low-level, mixed, hazardous, and nonhazardous wastes. Waste generated during construction would consist of wastewater, and solid nonhazardous and hazardous wastes. The nonhazardous waste would be disposed of as part of the construction project by the contractor, and the hazardous waste would be shipped to commercial RCRA-permitted treatment and disposal facilities. No soil contaminated with hazardous material or radioactive constituents is expected to be generated during construction. However, if any was generated it would be managed in accordance with site practice and all applicable Federal and State regulations.

After treatment and volume reduction of TRU waste, approximately 5 m^3 (7 yd^3) of TRU waste and 4 m^3 (5 yd^3) of mixed TRU waste from leaded gloves, windows, and contaminated lead shielding would be treated and packaged to meet the current planning-basis WIPP WAC or alternative treatment level. While awaiting shipment to WIPP (depending on decisions made in the ROD associated with the supplemental EIS for the proposed continued phased development of WIPP for disposal of TRU waste), TRU and mixed TRU wastes would be stored in above-grade storage facilities. One additional truck shipment per year or, if applicable, one regular train shipment every 2 years or one dedicated train shipment every 6 years would be required to transport these wastes to WIPP.

Following treatment and volume reduction, approximately 630 m^3 (824 yd^3) of LLW would require storage/disposal after treatment at ORR. Assuming a land usage of 3,300 m^3/ha (1,700 yd^3/acre), this would require 0.2 ha/yr (0.5 acres/yr) of LLW disposal area. If onsite disposal at ORR is not possible, approximately 38 LLW shipments per year to a DOE disposal facility would be required. The 0.2 m^3 (50 gal) of liquid mixed LLW and 65 m^3 (85 yd^3) of solid mixed LLW would be treated and disposed of in accordance with ORR Site Treatment Plan through the use of existing and planned facilities. The additional 2 m^3 (476 gal) of liquid hazardous waste and 2 m^3 (3 yd^3) of solid hazardous wastes would have minimal impact on waste management activities at ORR, as existing and planned facilities are adequate to store the increase while awaiting shipment to offsite RCRA-permitted facilities. Approximately 136,630 m^3 (36,100,000 gal) of liquid nonhazardous waste may require construction of utility and process wastewater treatment systems. The existing sanitary treatment system would be adequate. After volume reduction, 670 m^3 (876 yd^3) of solid nonhazardous wastes would require disposal at the onsite landfill.

Construct New Plutonium Storage Facility and Modify Existing Highly Enriched Uranium Storage Facilities at Y–12 Plant

Construction and operation of a consolidated Pu storage facility collocated with HEU upgrade would have an impact on existing ORR waste management activities, increasing the generation of TRU, low-level, mixed, hazardous, and nonhazardous wastes. Waste generated during construction would consist of wastewater, nonhazardous solids, and hazardous wastes. The nonhazardous waste would be disposed of as part of the construction project by the contractor, and the hazardous wastes would be shipped to commercial RCRA-permitted treatment and disposal facilities. The impacts would be identical to those presented in the previous section.

Construct New Plutonium and Highly Enriched Uranium Storage Facilities

Construction and operation of a consolidated Pu storage facility collocated with HEU storage would have an impact on existing ORR waste management activities, increasing the generation of TRU, low-level, mixed, hazardous, and nonhazardous wastes. Waste generated during construction would consist of wastewater, nonhazardous solids, and hazardous wastes. The nonhazardous waste would be disposed of as part of the construction project by the contractor, and the hazardous waste would be shipped to a commercial RCRA-permitted treatment and disposal facility. The sources of wastes are similar to those of the consolidated Pu storage facility with HEU upgrade; however, the quantity with the exception of TRU waste would change. The impacts from TRU waste would be identical to those identified in the two previous options.

Following treatment and volume reduction, approximately 630 m^3 (824 yd^3) of LLW contaminated with Pu and 20 m^3 (26 yd^3) of LLW contaminated with uranium would require treatment and storage/disposal at ORR. Assuming a land usage of 3,300 m^3/ha (1,700 yd^3/acre), this would require 0.2 ha/yr (0.5 acres/yr) of LLW disposal area. If onsite disposal at ORR is not possible, approximately 39 LLW shipments per year to a DOE disposal facility would be required. The 0.2 m^3 (55 gal) of liquid mixed LLW and 66 m^3 (86 yd^3) of solid mixed LLW would be treated and disposed of through the use of existing and planned facilities. The 2 m^3 (528 gal) of liquid hazardous waste and 2 m^3 (3 yd^3) of solid hazardous waste would have minimal impact on waste management activities at ORR, as existing and planned facilities are adequate to store the increase while

awaiting shipment to offsite RCRA-permitted facilities. The 171,840 m^3 (45,400,000 gal) of liquid nonhazardous waste may require construction of utility and process wastewater treatment systems. The existing sanitary treatment system would be adequate. After volume reduction, 870 m^3 (1,140 yd^3) of solid nonhazardous waste would require disposal at the onsite landfill.

Subalternative Not Including Strategic Reserve and Weapons Research and Development Materials

The exclusion of strategic reserve and weapons R&D materials would reduce the amount of operational waste volumes shown in Table 4.2.5.10–2 for the No Action Alternative, the Upgrade Alternative, and the Collocation Alternative. The decrease would be proportional to the amount of material excluded. [Text deleted.]

Phaseout

The phaseout of HEU storage would have little impact on ORR waste management activities. The quantities of waste would decrease by the increments shown in Table 4.2.5.10–2.